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ART. XI.—*The diagnosis of some wood-destroying Australian Basidiomycetes by their cultural characters.*

By LYLly D. REFSHAUGE, M.Sc., and EUNICE M. PROCTOR, M.Sc.

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Introduction.

The aim of this work has been to determine accurately the cultural characters of a number of wood-destroying fungi, and from such data to build keys for the identification of these forms in the laboratory. The following fourteen fungi have been studied.

Family Thelephoraceae.

Stereum illudens Berk.

Stereum lobatum Fries.

Stereum vellereum Berk.

Family Polyporaceae.

Fomes Clelandi Lloyd.

Fomes hemitephrus Berk.

Fomes robustus Karst.

Ganoderma appplanatum (Pers.) Pat.

Polyporus anthracophilus Cooke.

Polyporus arcularius (Batsch) Fr.

- Polyporus gilvus* Schwein.
Polyporus rhipidium Berk.
Polystictus versicolor (Linn.) Fr.
Trametes lilacino-gilva (Berk.) Lloyd.
Trametes ochroleuca (Berk.) Bres

Methods and Technique.

All forms were grown on the following media:—

MEDIUM A.—MALT AGAR. 17.5 grams agar, 25 grams malt, 1 litre water.

MEDIUM B.—POTATO-DEXTROSE AGAR, prepared as follows:—400 grams of sliced potato and 1 litre of distilled water are steamed for 30 minutes at 15 lbs. pressure and strained. 25 grams of agar are added and the whole is made up to 1 litre by adding distilled water. This is sterilized. 15 grams of dextrose are added, and this is tubed. The autoclave is heated until it steams before the tubes are placed in it, to prevent the decomposition of sugar from the action of heat.

MEDIUM C.—CZAPEK'S SYNTHETIC AGAR (modified) (4).

MEDIUM D.—CZAPEK'S SYNTHETIC AGAR with malachite green 0.5 grams magnesium sulphate, 1.0 grams monopotassium phosphate, 0.5 grams potassium chloride, 0.01 grams ferrous sulphate, 2.0 grams sodium nitrate, 30.0 grams dextrose, 25.0 grams agar, 0.07 grams malachite green, 1 litre distilled water.

As this work was for comparative purposes, the tubes which were used to make slopes of the various media were all of the same size. They measured 6 inches x $\frac{3}{4}$ inch, and the agar before sloping had a depth of 2 inches.

Inoculations were made from young cultures grown on malt agar, from stock cultures. Five slopes of each medium were inoculated with each species, i.e., 20 cultures were grown of each form; and the inocula were as nearly as possible of the same size, and were placed 3 inches from the base of the slope. Observations were made every three or four days at the beginning, and later every seven days; and were carried over a period of 31 days. The cultures were incubated at 25°C. The rate of growth was measured from the edge of the inoculum to the edge of the mycelial growth towards the base of the slope, and the colours were matched with Ridgway's colour charts (11).

Microscopic examinations were made of 9-12 day old cultures of the fourteen fungi grown on malt agar plates. Notable features were recorded by means of camera lucida drawings.

Cultural Characters.

Medium.	Age—days.	Extent of growth.	Type of growth.	Colour of mycelial mat.	Colour of reverse.
<i>Stereum illudens</i> Berk.					
A	8	Surface of medium not covered (1" growth)	Water-soaked appressed with downy-floccose patches	White and downy in places	Kaiser brown
A	12	Surface of medium covered	Straggly appressed-downy growth with downy - floccose patches	Straggly growth white; downy-floccose patches ochraceous salmon	Kaiser brown
A	31	Surface of medium covered	Now runs downy-floccose patches; straggly growth still present	Downy - floccose patches ochraceous salmon to salmon; straggly growth white	Orange cinnamon to Kaiser brown
B	31	Surface of medium covered (from 12th day)	Downy - floccose patches growth straggly as on malt	Salmon to apricot-buff; deeper colour than on malt	Chestnut
C	31	Surface of medium not covered	Downy	Mustard yellow to salmon with the advancing edge white	Chestnut
D	31	Very little growth present	White	Decolorized completely (from the 19th day)
<i>Stereum lobatum</i> Fries.					
A	8	Surface of medium not covered ($\frac{1}{2}$ " growth)	Downy with appressed edges and small floccose patches	White with yellow-brown inoculum, floccose parts white	
A	12	Surface of medium not quite covered	Woolly-floccose ..	White tinged with antimony yellow	
A	31	Surface of medium covered (from 14th day)	Woolly-floccose to felly	White tinged with honey yellow to tawny yellow	Salmon brown to amber brown
B	31	Surface of medium covered (from 14th day)	Woolly - floccose to woolly	White at the edges and tawny olive in the centre with russet drops of moisture	Amber brown to argus brown
C	31	Surface of medium covered (from 20th day)	Woolly - floccose to woolly	White tinged with tawny olive	Russet brown (from 28th day)
D	31	Growth very faint			
<i>Stereum vellereum</i> Berk.					
A	8	Surface of medium not quite covered (2" growth)	Cobwebby ..	White	
A	12	Surface of medium covered (from 10th day)	Cobwebby-woolly ..	White tinged with straw yellow	
A	31	Surface of medium covered (from 10th day)	Woolly	White tinged with cream yellow	
B	31	Surface of medium covered (from 10th day)	Woolly	White faintly tinged with cream yellow	
C	31	Surface of medium covered (from 14th day)	Woolly	Dirty white (colour not intense enough to be matched with Ridgway's colour chart (11))	Argus brown
D	31	Small amount of growth present ($\frac{1}{8}$ "	Woolly	White	

CULTURAL CHARACTERS—*continued.*

Medium.	Age—days.	Extent of growth.	Type of growth.	Colour of mycelial mat.	Colour of reverse.
<i>Fomes Clelandi</i> Lloyd.					
A	8	Surface of medium not covered ($\frac{1}{2}$ " growth)	Felty with velvety edges	brown on inoculum; the remainder white	
A	12	Surface of medium not covered ($\frac{3}{8}$ " growth)	Felty with velvety edges	Brown immediately surrounding the inoculum; the remainder white	
A	31	Surface of medium covered (from 25th day)	Felty with velvety edges	Mummy brown with white edges and chestnut drops of exudation	
B	31	Surface of medium covered	Felty with velvety edges	Mummy brown to russet brown with white edges	
C	31	Surface of medium not covered ($1\frac{1}{4}$ " growth)	Woolly to felty with appressed edges	Light ochraceous buff to tawny buff with white edges; chestnut drops of exudation	Chestnut
D	31	Small amount of growth present ($\frac{1}{4}$ " growth)	Felty	Mummy brown with white edges	Decolorization to a small extent near margin of colony
<i>Fomes hemitephrus</i> Berk.					
A	8	Surface of medium not covered ($\frac{1}{2}$ " growth)	Downy - appressed; the appressed parts moist looking and the edges downy	Downy parts white, appressed parts colourless	
A	12	Surface of medium not covered ($1\frac{1}{4}$ " growth)	Downy - appressed; the edges downy and the appressed parts moist looking	Downy parts white, appressed parts colourless	
A	31	Surface of medium covered (from 19th day)	Downy (the appressed moist parts on the 28th day replaced by downy patches)	White	
B	31	Surface of medium covered	Thick woolly; drops of moisture suspended in mycelium, giving pitted appearance	White	Dresden brown
C	31	Surface of medium not covered ($\frac{3}{8}$ " growth)	Appressed with downy edges and wrinkled medium	White	Black
D	31	Surface of medium not covered ($1\frac{1}{4}$ " growth)	Moist appressed and patches of downy growth	White	Decolorized (from 8th day)
<i>Fomes robustus</i> Karst.					
A	8	Surface of medium not covered ($\frac{1}{4}$ " growth)	Downy with appressed edges	Buckthorn brown with white edges	Amber brown
A	12	Surface of medium not covered ($\frac{3}{8}$ " growth)	Downy with pitted inoculum	Ochraceous tawny to buckthorn brown; edges white	Chestnut
A	31	Surface of medium not covered	Woolly with downy edges	Ochraceous tawny to cinnamon brown with warm buff edges, and chestnut drops of exudation suspended in the mycelium	Chestnut

CULTURAL CHARACTERS—continued.

Medium.	Age— days.	Extent of growth.	Type of growth.	Colour of mycelial mat.	Colour of reverse.
<i>Fomes robustus</i> Karst—continued.					
B	31	Surface of medium not covered	Woolly	Aerial hyphae warm buff and the remainder ochraceous fawny to cinnamon brown	Cinnamon brown to chestnut
C	31.	Surface of medium not covered; rate of growth slow ($\frac{3}{4}$ " growth)	Appressed - downy with numerous patches of short mycelium near base of slope	Ochraceous buff to orange, with white patches of short mycelium,	Dark greenish olive
D	31	Very slight growth restricted to the inoculum	Chestnut brown	
<i>Ganoderma applanatum</i> (Pers.) Pat.					
A	8	Surface of medium not covered ($\frac{1}{2}$ " growth)	Powdery	White	
A	12	Surface of medium not covered ($\frac{1}{2}$ " growth)	Appressed with zoning present	White with faint tint of yellow near inoculum	
A	31	Surface of medium covered (from 20th day)	Powdery to felty with shattering of medium	White tinged with baryta yellow	
B	31	Surface of medium covered (from 20th day)	Felty with shattering of medium	White tinged with buff yellow and baryta yellow	
C	31	Surface of medium not quite covered	Lumpy growth in centre around which medium wrinkled	White tinged with old gold	Raw umber
D	31	Surface of medium not covered ($1\frac{1}{4}$ " growth)	Downy	White	Decolourized (from 26th day)
<i>Polyporus anthracophilus</i> Cooke.					
A	8	Surface of medium not covered ($\frac{1}{2}$ " growth)	Downy with appressed edges; appressed parts silky in some cases	White	
A	12	Surface of medium not covered ($\frac{3}{4}$ " growth)	Downy-appressed ..	White tinged with warm buff, edges white	
A	31	Surface of medium not covered	Downy; with pitted lumps of mycelium	White tinged with warm buff	
B	31	Surface of medium not covered ($1\frac{1}{4}$ " growth)	Powdery to felty with pitted lumps of mycelium	Cinnamon with white edges	Sayal brown
C	31	Surface of medium not covered ($1\frac{1}{4}$ " growth)	Downy with pitted lumps of mycelium	White tinged with ochraceous buff; pitted lumps of mycelium buck-thorn brown	
D	31	Very slight growth present.			

CULTURAL CHARACTERS—*continued.*

Medium.	Age—days.	Extent of growth.	Type of growth.	Colour of mycelial mat.	Colour of reverse.
<i>Polyporus arcularius</i> (Batsch) Fr.					
A	8	Surface of medium not covered (2 nd growth)	Downy with a number of patches of short mycelium	White, slightly tinged with pink	Kaiser brown
A	12	Surface of medium covered	Woolly - floccose; stipes of fruiting bodies present	White tinged with warm buff	Kaiser brown
A	31	Surface of medium covered	Woolly - floccose; normal fruiting bodies present	White tinged with cinnamon buff, and mikado brown surrounding bases of stipes	Decolourized
B	31	Surface of medium covered (from the 12th day)	Felty; normal fruiting bodies present	White tinged with mustard yellow and clay; mikado brown at bases of stipes	Decolourized
C	31	Surface of medium covered (from the 20th day)	Woolly-floccose	White tinged with ochraceous tawny to clay; and drops of exudation chestnut	Dresden brown
D	31	Surface of medium not covered; rate of growth slow (1 st growth)	Felty	White with mikado brown at bases of stipes	Decolourized to a small extent near margin of colony
<i>Polyporus gilvus</i> Schwein.					
A	8	Surface of medium not covered (1 st growth)	Downy	Tawny with tufts of lighter warm buff; edges white	Sayal brown
A	12	Surface of medium not covered (1 st growth)	Tufted appearance in centre, with downy edges; zoning present	Ochraceous buff with tufts of warm buff; edges white to pinard yellow	Brussels brown to citrine
A	31	Surface of medium covered (from the 28th day)	Tufted woolly with zoning and pitted inoculum	Warm buff to antimony yellow; aerial hyphae lighter in colour	Saccardo green to amber brown
B	31	Surface of medium covered (from the 28th day)	Felty	Warm buff to ochraceous buff to antimony yellow	Blackish green to sepia
C	31	Surface of medium not covered (1 st growth)	Felty	White to ochraceous buff to antimony yellow; large amber drops of gelatinous exudation	Raw amber to black
D	31	Surface of medium not covered (1 st growth)	Powdery with pitted inoculum	White to cinnamon brown	Decolourized (from 12th day)
<i>Polyporus rhipidium</i> Berk.					
A	8	Surface of medium not covered (1 st growth)	Downy with appressed edges	White	
A	12	Surface of medium not covered (1 st growth)	Downy with appressed edges	White	
A	31	Surface of medium not covered (2 nd growth)	Downy-appressed	White	

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CULTURAL CHARACTERS—continued.

Medium.	Age—days.	Extent of growth.	Type of growth.	Colour of mycelial mat.	Colour of reverse.
<i>Po'yporus rhipidum</i> Berk—continued.					
B	31	Surface of medium not quite covered	Downy-appressed ..	Dirty white (colour not intense enough to match with Ridgway's colour chart (11))	Suff brown
C	31	Surface of medium not covered (1½" growth)	Downy-appressed ..	Cinnamon buff ..	Tawny buff
D	31	Surface of medium not covered (¾" growth)	Downy-appressed ..	White	Decolorized (from 24th day)
<i>Polystictus versicolor</i> (Linn.) Fr.					
A	8	Surface of medium covered (from the 4th day)	Downy to woolly-floccose with downy edges	White	
A	12	Surface of medium covered (from the 4th day)	Woolly-floccose to felty	White; small drops of exudation present (colourless)	Decolorized at top
A	31	Surface of medium covered (from the 5th day)	Felty and in some cases powdery to felty	White tinged with warm buff; large straw yellow gelatinous drops of exudation present	Decolorized
B	31	Surface of medium covered (from 8th day)	Felty	White tinged with wax yellow at bases of slopes; straw yellow gelatinous drops of exudation present	Decolorized
C	31	Surface of medium covered (from the 12th day)	Felty	White tinged with pale ochraceous buff; gelatinous drops of exudation present	Raw sienna
D	31	Surface of medium not covered (1½" growth)	Powdery appressed	White	Decolorized (from 4th day)
<i>Trametes lilacino-gilva</i> (Berk.) Lloyd.					
A	8	Surface of medium not covered (¾" growth)	Appressed-downy with a number of floccose patches present; appressed parts silky	White	
A	12	Surface of medium not covered (¾" growth)	Downy with appressed edges; zoning present	White to sea-shell pink to salmon pink	
A	31	Surface of medium covered (from 20th day)	Downy to woolly; zoning present	Light ochraceous salmon to buff pink to congo pink	
B	31	Surface of medium covered (from 20th day)	Woolly-floccose, zoning present from the 10th day	White slightly tinged with straw yellow	
C	31	Surface of medium covered (from 20th day)	Woolly; zoning present from the 10th day	Light ochraceous buff	Ochraceous tawny
D	31	Surface of medium not covered rate of growth slow (¾" growth)	Downy-appressed ..	Salmon pink with patches of hyphae showing a green colour	Decolorization observed on the 31st day

CULTURAL CHARACTERS—*continued.*

Medium	Age— days.	Extent of Growth.	Type of Growth.	Colour of mycelial mat.	Colour of reverse.
<i>Trametes ochroleuca</i> (Berk.) Bres.					
A	8	Surface of medium not covered ($\frac{3}{8}$ " growth)	Woolly with appressed edges	White	
A	12	Surface of medium not covered ($\frac{3}{8}$ " growth)	Thick felty with appressed edges	White	
A	31	Surface of medium covered	Thick felty ..	White	Becoming decolourized
B	31	Surface of medium not covered ($1\frac{1}{2}$ " growth)	Powdery to felty with appressed edges	White tinged with maize yellow to laryta yellow; drops of exudation colourless	
C	31	Surface of medium not covered; rate of growth slow (1" growth)	Velvety	White tinged with pale ochraceous buff; drops of amber coloured exudation present	Cinnamon
D	31	Surface of medium not covered; rate of growth slow ($\frac{1}{2}$ " growth)	Powdery	White	Decolourized (from the 8th day)

Microscopic Features.

STEREUM ILLUDENS Berk.

Hyphae varied in width from 1-3 μ . Clamp connexions were sparsely formed, averaging one per field. Branching was moderately abundant, and often occurred at right angles. Chlamydospores were observed. (Fig. 4.)

STEREUM LOBATUM Fries.

Hyphae varied in width from 1.5-7 μ . Aerial hyphae were yellow in colour. Clamp connexions were sparsely formed, averaging two per field, and they occurred characteristically in groups. Occasionally they were observed singly, and when averaging the number per field a group was counted as one. Clamp connexions were observed only on the larger hyphae, the smaller hyphae showing branching at right angles. Small rhombic crystals were observed. (Fig. 6.)

STEREUM VELLEREUM Berk.

Hyphae varied in width from 1-11 μ . Clamp connexions were sparsely formed, averaging 1.2 per field, and they occurred characteristically in groups. They were observed on the larger hyphae only, the smaller hyphae showed branching at right angles. When averaging the number of clamp connexions per field a group was counted as one. Small rhombic crystals were present. (Fig. 5.)

FOMES CLELANDI Lloyd.

Hyphae varied in width from 0.8-5 μ . Clamp connexions were sparsely formed and averaged three per field. They occurred opposite and near branches and as often along the length of the hyphae. Branching of hyphae was moderately abundant. (Fig. 2.)

FOMES HEMITEPIRUS Berk.

Hyphae varied in width from 1.5-3 μ . Clamp connexions were sparsely formed, averaged 1.1 per field, and occurred generally along the length of the hyphae. Branching of hyphae was not abundant. Chlamydospores were observed and crystals were present. (Fig. 3.)

FOMES ROBUSTUS Karst.

Hyphae varied in width from 1-3 μ . Aerial hyphae were brown in colour, the submerged hyphae were colourless and branched abundantly. Clamp connexions were sparsely formed averaging 0.6 per field, and they occurred more frequently along the length of the hyphae. Crystals were present, but not in abundance. (Fig. 1.)

GANODERMA APPLANATUM (Pers.) Pat.

Hyphae varied in width from 1-4 μ . Clamp connexions were moderately abundant, averaging 5.5 per field, and they occurred sometimes associated with branching, but more often along the length of the hyphae. Chlamydospores were observed and small rhombic crystals were present. (Fig. 11.)

POLYPORUS ANTHRACOPHILUS Cooke.

Hyphae varied in width from 1.5-3 μ . Clamp connexions were abundant, averaging 10 per field, and 64 per cent. of the clamp connexions observed occurred in association with branches. Sometimes branches were observed growing out from clamp connexions. Chlamydospores were present: they were large and were both terminal and intercalary in position. Large cubic crystals were present. (Fig. 8.)

POLYPORUS ARCULARIUS (Batsch.) Fr.

Hyphae varied in width from 1.3 μ . Clamp connexions were moderately abundant, averaging 5.2 per field, and they were observed more often in association with branching, than along the length of the hyphae. Branching was moderately abundant. Swellings were observed on certain submerged hyphae. Chlamydospores were present occurring in both a terminal and intercalary position. Small and oblong crystals were present. (Fig. 7.)

POLYPORUS GILVUS Schwein.

Hyphae varied in width from 1-5 μ . Clamp connexions were sparsely formed, averaging 1.6 per field, and they occurred generally along the length of the hyphae. Aerial hyphae were thick, branched and of a brown colour. Terminal swellings were present on many submerged hyphae. Long narrow crystals were present. (Fig. 9.)

POLYPORUS RHIPIDIUM Berk.

Hyphae varied in width from 1-4 μ . Clamp connexions were abundant and averaged 11 per field. Of the clamp connexions observed, 62 per cent. occurred along the length of the hyphae. Branching of hyphae was moderately abundant. Crystals were present some of which were irregular and others were cubic. (Fig. 10.)

POLYSTICTUS VERSICOLOR (Linn.) Fr.

Hyphae varied in width from 1-3.5 μ . Clamp connexions were moderately abundant, averaging 6.5 per field. Branching of hyphae was generally at right angles. Long and narrow crystals were present. (Fig. 12.)

TRAMETES LILACINO-GILVA (Berk.) Lloyd.

Hyphae varied in width from 2-3 μ . Clamp connexions were abundant, averaging 9 per field. Of the clamp connexions observed 67 per cent. occurred along the length of the hyphae. Chlamydospores were observed and small cubic and rhombic crystals were present. (Fig. 14.)

TRAMETES OCHROLEUCA (Berk.) Bres.

Hyphae varied in width from 0.8-4 μ . Clamp connexions were abundant, averaging 8 per field. Of the clamp connexions observed, 58 per cent. occurred in association with branching. Large irregular crystals were present. (Fig. 13.)

Discussion of Results of Cultural Work.

The observations made from the malt, potato-dextrose, and Czapek's synthetic plus malachite green agar cultures were of greater value for comparative work than those made from the Czapek's synthetic agar (modified). However, observations from cultures on all four media were used in the building up of the keys given below.

Certain fungi formed fruiting bodies more readily in culture than others. *Polyporus arcularius* formed normal fruiting bodies by the thirteenth day on malt agar. *Fomes Clelandi* formed

very conspicuous bodies that were suspected of being abnormal sporophores. Other forms such as *Polystictus versicolor*, *Polyporus anthracophilus*, and *Polyporus gilvus* formed pitted masses of mycelium which were possibly rudimentary fruiting bodies.

The decolourization of the medium that occurred with Czapek's synthetic, plus malachite green agar, with many forms was interesting. In all such cases, with one exception, e.g., *Trametes lilacino-gilva*, no green colour was visible in any of the hyphae; with *T. lilacino-gilva* a very definite green colour was, however, observed in some of the mycelial threads; in the case of *Stercum illudens* where only the faintest perceptible growth occurred on this agar, it was nevertheless accompanied by a definite decolourization of the entire slope. The questions naturally arise; were those fungi which decolourized this medium using the malachite green as a food material, or were they producing, during their metabolic activities, a substance that changed or acted on the dye? Some experiments were carried out to try to explain this decolourization. Hydrogen peroxide was added to a malachite green slope, and as no decolourization occurred an oxidase action was not indicated. The same conclusion was arrived at when a piece of potato was placed on the surface of a malachite green slope and again no decolourization occurred. A culture showing the decolourized phenomenon was immersed in 5 per cent. formalin for half a day, another was killed by heating at 70°C. for half an hour, and from these, a portion of the decolourized agar and the mycelial mat was transferred to a fresh Czapek's plus malachite green slope; no decolourization was observed indicating that the disappearance of the colour might not be due to any metabolic by-product produced during the growth of the fungus and diffused into the medium, but might rather be a phenomenon dependent on the *living* form itself.

Keys.

Four dichotomous keys were compiled from the results obtained, three from the comparative cultural results, and one using the microscopic features:—

1. Key—using the results obtained from growth on malt agar.
2. Key—using results obtained from growth on Czapek's synthetic agar and malachite green, Czapek's synthetic agar modified and malt agar.
3. Key—using the results obtained from growth on potato-dextrose agar.
4. Key—using the microscopic features as observed from growth on malt agar.

1. Key—using results obtained from growth on malt agar.

A. Mycelial mat soon colored on malt agar ..	B
A. Mycelial mat remaining white until old (at least 12 days old) and then becoming tinged with colour on malt agar ..	C
A. Mycelial mat remaining white ..	D
B. Colour salmon to congo pink	<i>Trametes lilacino-gilva</i>
B. Colour mummy brown, at least in the centre ..	<i>Fomes Clelandi</i>
B. Colour warm buff or antimony yellow ..	<i>Polyporus gilvus</i>
B. Colour ochraceous buff to cinnamon brown ..	<i>Fomes robustus</i>
C. Growth felty	E
C. Growth downy	<i>Polyporus anthracophilus</i>
C. Growth woolly	<i>Stereum vellereum</i>
C. Growth woolly-floccose	<i>Polyporus arcularius</i>
C. Growth cottony-floccose	<i>Stereum illudens</i>
E. Growth rapid (4 days to cover slope) ..	<i>Polystictus versicolor</i>
E. Growth slower	F
F. Reverse of medium unchanged, and growth may be powdery	<i>Ganoderma applanatum</i>
F. Reverse of medium changed, sudan brown to amber brown and growth may be woolly-floccose to felty	<i>Stereum lobatum</i>
D. Growth felty	<i>Trametes ochroleuca</i>
D. Growth downy	G
G. 19 days to cover slope	<i>Fomes hemitephrus</i> ..
G. 30 days to cover slope	<i>Polyporus rhipidium</i>

2. Key—using results obtained from growth on Czapek's synthetic agar and malachite green; on Czapek's synthetic agar (modified); on Malt Agar.

A. Czapek's synthetic agar and malachite green medium decolourized	B
A. Czapek's synthetic agar and malachite green medium not decolourized	C
B. Medium decolourized rapidly (within 4 days)	<i>Polystictus versicolor</i>
B. Medium decolourized fairly rapidly (7-8 days)	D
B. Medium decolourized slowly (12-30 days) ..	E
D. Rate of growth slow ($\frac{1}{2}$ inch in a month) ..	<i>Trametes ochroleuca</i>
D. Rate of growth fairly rapid ($1\frac{1}{4}$ inch in a month)	<i>Fomes hemitephrus</i>
E. Fairly good growth in a month	F
E. Very faint growth in a month	<i>Stereum illudens</i>
F. Growth coloured cinnamon brown	<i>Polyporus gilvus</i>
F. Growth coloured mummy brown (at least in centre)	<i>Fomes Clelandi</i>
F. Growth white (pure white)	G
F. Growth salmon pink	<i>Trametes lilacino-gilva</i>
F. Growth white tinged with mikado brown ..	<i>Polyporus arcularius</i>
G. Wrinkling of medium present on Czapek's synthetic agar (modified)	<i>Ganoderma applanatum</i>
G. No wrinkling of medium present on Czapek's synthetic agar (modified)	<i>Polyporus rhipidium</i>
C. Moderate growth present	H
C. Very faint growth present	I
H. Colour of growth white	<i>Stereum vellereum</i>
H. Colour of growth chestnut brown	<i>Fomes robustus</i>
I. Moderately rapid growth on malt agar (14 days to cover slope)	<i>Stereum lobatum</i>
I. Slow growth on malt agar (33 days to cover slope)	<i>Polyporus anthracophilus</i>

3. Key—using results from growth on Potato-Dextrose agar.

- A. Growth fairly rapid (7-14 days to cover surface of medium) B
- A. Growth slow but medium covered in a month C
- A. Growth very slow—medium not covered in a month *Trametes ochroleuca*
- B. Growth felty *Polystictus versicolor*
- B. Growth woolly-floccose to woolly D
- B. Growth downy-floccose *Stereum illudens*
- D. Reverse of medium unchanged (i.e., not coloured) *Stereum vellereum*
- D. Reverse of medium colourless (i.e., decolourized) *Polyporus arcularius*
- D. Reverse of medium coloured (amber brown) *Stereum lobatum*
- C. Growth remaining white *Fomes hemitephrus*
- C. Growth white when culture young, but coloured when old E
- C. Growth coloured F
- E. Growth felty (with shattering of medium) *Ganoderma applanatum*
- E. Growth woolly-floccose *Trametes lilacino-gilva*
- E. Growth downy—appressed *Polyporus rhigidium*
- F. Mummy brown (with russet brown tinges) *Fomes Clelandi*
- F. Ochraceous buff to antimony yellow (aerial hyphae lighter) *Polyporus gilvus*
- F. Ochraceous tawny to cinnamon brown *Fomes robustus*
- F. Cinnamon with white edges *Polyporus anthracophilus*

4 Key—using microscopic features.

- A. Clamp connexions abundant (8-11 per field) B
- A. Clamp connexions moderately abundant (5-6 per field) C
- A. Clamp connexions rare (0-3 per field) D
- B. Clamp connexions usually associated with branches E
- B. Clamp connexions usually along the length of the hyphae F
- E. Chlamydospores abundant *Polyporus anthracophilus*
- E. Chlamydospores absent *Trametes ochroleuca*
- F. Chlamydospores abundant *Trametes lilacino-gilva*
- F. Chlamydospores scarce *Polyporus rhigidium*
- C. Branching generally at right angles *Polystictus versicolor*
- C. Branching seldom at right angles G
- G. Crystals present, small, oblong *Polyporus arcularius*
- G. Crystals rhombic *Ganoderma applanatum*
- D. Clamp connexions in groups H
- D. Clamp connexions not in groups I
- H. Aerial hyphae coloured (yellow) *Stereum lobatum*
- H. Aerial hyphae not coloured *Stereum vellereum*
- I. Clamp connexions usually associated with branching *Fomes Clelandi*
- I. Clamp connexions usually along the length of the hyphae J
- J. Aerial hyphae coloured K
- J. Aerial hyphae not coloured L
- K. Many submerged hyphae ending in terminal swellings *Polyporus gilvus*
- K. Submerged hyphae not ending in terminal swellings *Fomes robustus*
- L. Chlamydospores present *Stereum illudens*
- L. Chlamydospores absent *Fomes hemitephrus*

Summary.

1. Fourteen wood-destroying fungi, three of which belong to the Thelephoraceae and the remainder to the Polyporaceae, were grown on four different media.

2. The cultural characters of these fungi were determined accurately, and also their microscopic features.

3. Four keys were compiled, three using the comparative cultural results and one using the microscopic features.

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Glossary.

Appressed.—Mycelium which is prostrate on the surface of the agar. This is often the first stage in the type of growth of the mycelium, and it may give rise to other forms.

Cobwebby.—Long, weak, inter-tangled hairs which are semi-prostrate, not thick enough to be either woolly or felty, but are not short enough to be considered downy.

Downy.—Short fine hairs loosely scattered over the surface of the mycelium giving it a downy appearance.

Felty.—Matted with inter-twined hairs resembling felt.

Floccose.—Scattered patches of denser hyphae over the surface of any mycelial mat.

Velvety.—Mycelium with distinct, dense straight short hairs like the pile of velvet.

Woolly.—A dense mass of mycelium consisting of long tortuous hairs.

Hyphenated Words.—"Appressed-downy" indicates a condition intermediate between the two conditions, while "downy to appressed" indicates that the older portions are "downy" and the younger are "appressed."

Reverse.—The side of the medium opposite to the surface on which the fungus is growing (i.e., the back) is termed the "reverse."

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Explanation of Figures.

FIG. I.

- 1.—*Fomes robustus* Karst. × 232.
 - A. Brown aerial hyphae
 - B. Clamp connexions.
 - C. Crystals.
- 2.—*Fomes hemitephrus* Berk. × 232.
 - A. Clamp connexions.
 - B. Chlamydospores.
 - C. Crystals.
- 3.—*Fomes Clelandi* Lloyd × 232.
 - A. Clamp connexions associated with branching.
 - B. Clamp connexions occurring along the length of the hyphae.
- 4.—*Stereum illudens* Berk. × 232.
 - A. Clamp connexions occurring along the length of the hyphae.
 - B. Chlamydospores.
 - C. Branching at right angles.
- 5.—*Stereum vellereum* Berk. × 400.
 - A. Large hyphae with groups of clamp connexions.
 - B. Smaller hyphae showing branching at right angles.
 - C. Crystals.
- 6.—*Stereum lobatum* Fries. × 400.
 - A. Clamp connexions occurring in groups.
 - B. Clamp connexions occurring singly.
 - C. Hyphae branching at right angles.
 - D. Crystals

Fig. II.

- 7.—*Polyporus anthracophilus* Cooke × 232.
 A. Clamp connexions.
 B. Clamp connexions which have grown into branches.
 C. Chlamydospores.
 D. Crystals.
- 8.—*Polyporus arcularius* (Batsch.) Fr. × 232.
 A. Clamp connexions occurring in association with branching.
 B. Chlamydospores.
 C. Crystals.
9. *Polyporus gilvus* Schwein × 232.
 A. Clamp connexions occurring along the length of the hyphae.
 B. Terminal swellings on the hyphae.
 C. Crystals.
 D. Branching.
- 10.—*Polyporus rhipidium* Berk. × 400.
 A. Clamp connexions occurring along the length of the hyphae.
 B. Crystals.

FIG. III.

- 11.—*Ganoderma applanatum* (Pers.) Pat. × 232.
 A. Clamp connexions.
 B. Chlamydospores.
 C. Swellings on submerged hyphae.
 D. Crystals.
- 12.—*Polystictus versicolor* (Linn.) Fr. × 400.
 A. Clamp connexions.
 B. Branching at right angles.
 C. Crystals.
- 13.—*Trametes ochroleuca* (Berk.) Pres. × 232.
 A. Clamp connexions occurring in association with branching.
 B. Crystals.
- 14.—*Trametes lilacino-gilva* (Berk.) Lloyd × 232.
 A. Clamp connexions along the length of the hyphae.
 B. Chlamydospores.
 C. Branching of the hyphae.
 D. Crystals.

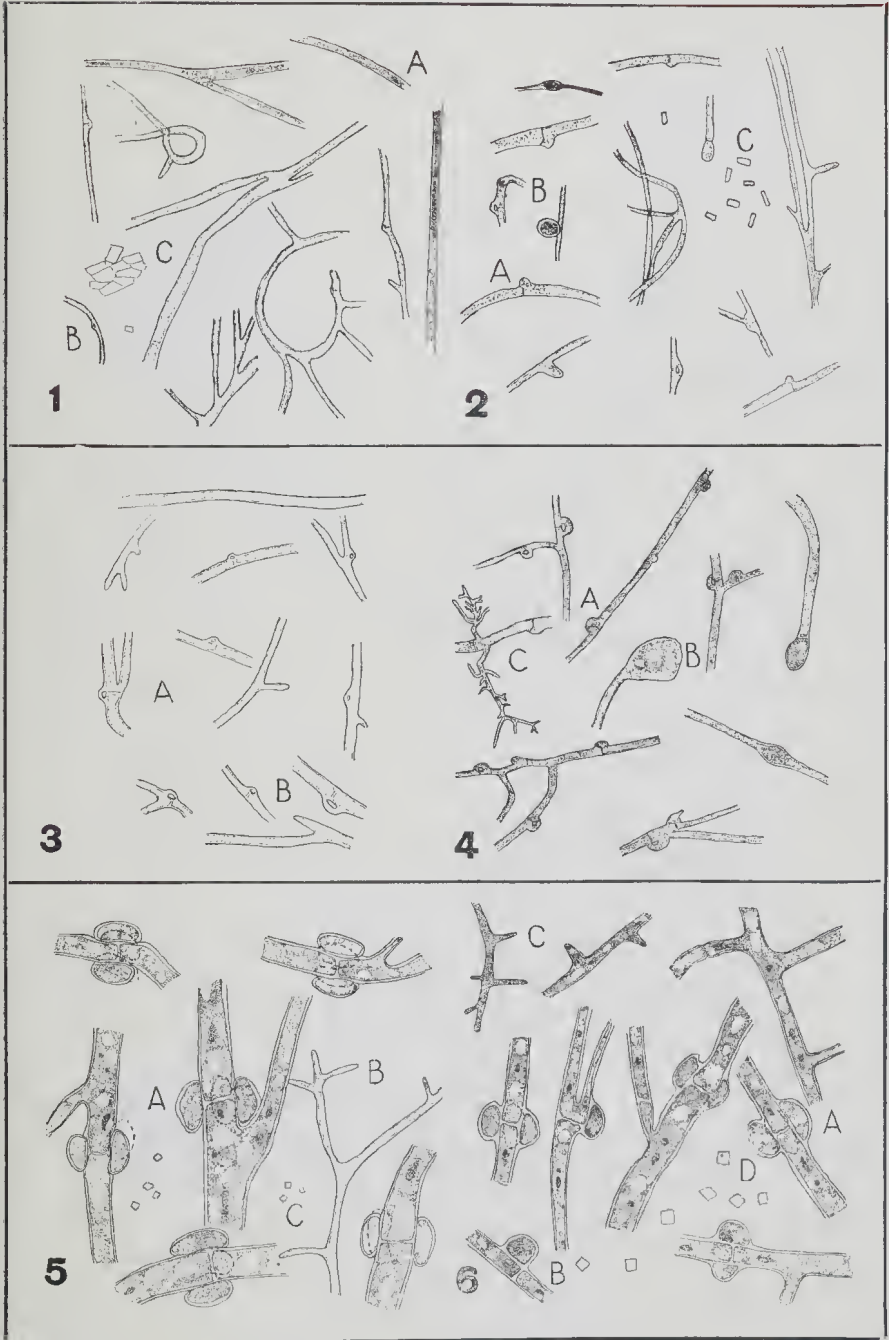


FIG. 1.

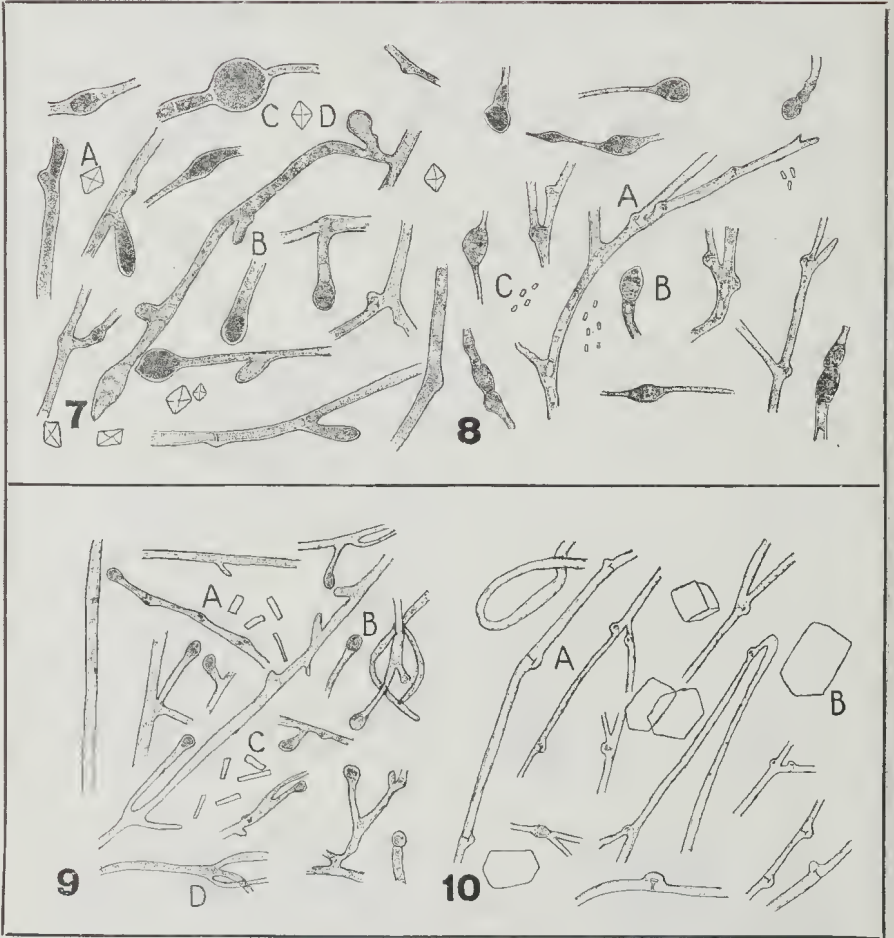


FIG. 2.

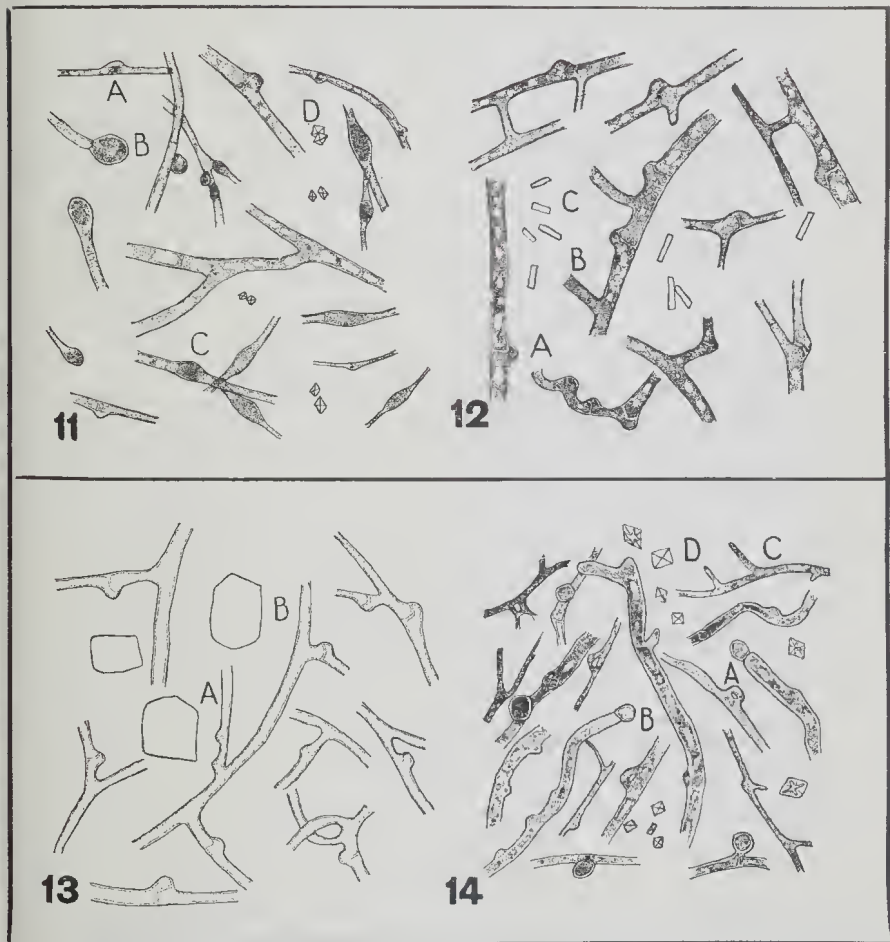


FIG. 3